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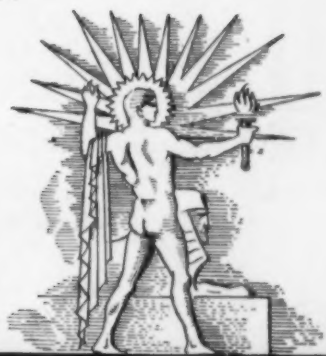
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



OCTOBER 3, 1931

One of Darwin's Playfellows

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW THAT

Harnessing a geyser for use in eradication of cattle scabies has been successfully carried out by a construction company in Nevada.

A flood on the Rio Grande River in New Mexico, in 1929, brought so much debris and silt into some valley lands that the character of the soil was entirely changed.

A garment-making record was set in England recently when wool was shorn from 12 sheep and turned out as a finished suit in two hours, 10 minutes.

Deer, particularly mule deer, are very local in their range, and sometimes die of starvation when only a few miles away ample forage is available.

More than 3,000 years ago, physicians recognized that paralysis of one side of the body is linked with a condition of the brain on the opposite side.

It is found that copperized paper wrappers for pears in shipment will practically prevent the spread of "gray mold" or "nest decay."

The earth has about 6,000,000 square miles of ice on its surface, of which amount 5,000,000 is in the Antarctic.

The ocean off the California coast made for itself a new high temperature record of 78.4 degrees last summer.

A new plastic material made of sugar is unburnable, and is expected to be valuable therefore in X-ray and photographic films.

Ducks, ordinarily thought of as game birds, are great weed consumers: the stomach of a duck killed in Louisiana contained more than 72,000 weed seeds.

Hosiery manufacturers are experimenting with elastic yarn in the rib of hosiery, to replace garters and supporters.

Seeding lawns in the autumn, rather than in spring, is advocated by a seed analyst of a New York State experiment station, because the grass established in the fall can make an earlier spring start and because in autumn weeds are less apt to choke out the new seed.

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Science Service presents over the radio, an address

HUMAN VARIATIONS

By Dr. Adolph Schultz, associate professor of physical anthropology at the Johns Hopkins University and authority on evolution

Friday, October 9, at 3:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

ARCHAEOLOGY

Stone Points With Grooves Prove Puzzle to Scientists

Alaskan Slate Point Regarded as Modern While Flint Piece of Same Type is Found Under Bone of Mammoth

STONE points strongly resembling the famous "Folsom dart points," of reputed great antiquity, but with evidence of comparative recency, have been found in two localities in Alaska by Dr. Ales Hrdlicka, anthropologist of the U. S. National Museum. The new finds, shown by Dr. Hrdlicka to a Science Service staff member, are rubbed out of slate instead of being chipped out of flint like the Folsom points, but allowing for these differences of material and workmanship they show a great similarity in shape and in the basic idea underlying their construction.

When first found several years ago, associated with the bones of an extinct bison species in a New Mexico fossil bed, the Folsom points were hailed as unique among stone missile-heads, both ancient and modern, found in America. The outstanding feature, not shared by any other arrow or dart heads, was a broad groove down each side. This was interpreted at first as a "blood groove," to insure freer bleeding by the stricken game; but it is also possible that its purpose was merely to make for easier penetration by taking off a certain amount of unnecessary thickness.

But now the same kind of a groove appears on the points discovered by Dr. Hrdlicka during his Alaskan explorations last summer. There are five such points, some of them fragmentary, but all of them showing the highly specialized groove in most unmistakable fashion. One of them was found at a village site on the mainland, the rest on the Alaskan peninsula.

What gives special interest to the find and suggests a strong probability that these slate points are fairly modern, strongly though they resemble the Folsom flints, is the discovery by Dr. Hrdlicka of a blue bead, of undoubted Russian origin, within a foot of one of the points and at the same level in the earth.

Of interest in the same connection are several other points which were discovered in eastern Canada some time ago but which were not described in a scientific publication until recently. They were found in Algonkian Indian campsites. These, like the Alaskan points, are of slate, and they bear the same shallow groove on each side. These points also are believed to be of modern date.

Right on the heels of the discovery by Dr. Ales Hrdlicka of slate points resembling the "Folsom type" of flints, but of apparently modern date, comes the discovery of another flint point, unquestionably of the "Folsom type," buried under the shoulder blade of a mammoth, and therefore apparently ancient.

Discovered in Nebraska

The new find was made in the course of excavating the skeleton of a mammoth which had been discovered in Nuckolls County, Nebraska, and is described in a report to Science Service by J. D. Figgins, director of the Colorado Museum of Natural History. The excavation was conducted by A. M. Brooking, director of the Hastings Museum, Hastings, Nebraska.

"The formation in which the skeleton was found consists of stratified layers of sand and gravel, of varying thickness, separated by thinner strata of sandy silt and dark gray clary or marl," Mr. Figgins states. The several feet of these deposits are overlaid with aeolian sand, capped with prairie loess; the overlying deposits having a total thickness of 16 feet. Layers of coarser sand and gravel are exposed below the skeleton, to a depth of about five feet, where they disappear in the sands and boulders of a normally dry stream channel. At times this channel carries a large volume of water, and through undercutting and caving both the skeleton and a vertical section of the deposit were exposed."

Mr. Brooking and his assistants went to work to remove the skeleton. Clearing the material away from the massive left shoulder blade, Mr. Brooking instructed one of his assistants, Junior Brooks, to cut passages through the earth beneath the bone, through which to pass bandages by which it could be removed without breaking it.

It was while at work digging these little tunnels under the shoulder blade that Mr. Brooking encountered the flint point, about midway beneath the bone. He pulled it out before he realized what he had found. Present at the moment were Mr. Brooking and another assistant, Myron Youngblood.

"While it is unfortunate that the artifact was removed from the position where it was uncovered," Mr. Figgins comments, "the nature of the undisturbed matrix, its situation and the integrity of the discoverers exclude doubt of its original association with the mammoth skeleton. It must be regarded as contemporaneous."

The point is quite similar to the original "Folsom type" dart point found associated with the bones of an extinct species of bison at Folsom, N. M., some years ago. It is of the same shape, and has the same characteristic broad groove along each side. This particular point had been badly worn and blunted, and shows signs of resharpening.

Association of human tools and weapons with the bones of extinct animals in this country was originally considered evidence of extreme antiquity of man in America—possibly a hundred thousand or over a half million years. Now there is a tendency among scientists to consider also the possibility that some of these animals—even mammoths and giant ground sloths—may have survived until a few scores of thousands of years ago.

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ENIGMATIC

Here are the two dart points which scientists are at a loss to correlate On the left is the "Folsom type" dart point found associated with a mammoth skeleton; the other is one of the side-grooved slate points discovered by Dr. Hrdlicka in Alaska.

RADIO-AVIATION

Flying to Be Made Safer Through New Radio Device

AVIATORS may receive weather reports without interruption to the radio signals which keep them to their course, now that the U. S. Bureau of Standards has perfected apparatus for the simultaneous transmission of radio beacon direction signals with voice communication.

At present, when a ground station wishes to give pilots information, it must discontinue the beam transmission it uses to direct airplanes. This may mean that aircraft will wander off course and become lost, especially in bad weather when it is necessary to issue information about flying conditions.

For more than a year the Bureau of Standards has experimented with the "visual-range beacon signal" transmitter, which forms the basis of the new beacon system. A pilot has before him a small indicator containing two vibrating reeds. When he is on course the reeds vibrate so rapidly that their ends seem to be two narrow white bands, side by side and of the same height. If the plane gets off course on either side, the amplitude of vibration of the reed increases on the side to which the plane is veering, and therefore the white band on that side becomes wider, while the width of the band on the opposite side decreases. This happens because the reeds are actuated by radio signals sent out on either side of the ground station to which the aviator is flying, and thus he has a visual indication when he wanders too far to either side.

The new apparatus, developed by F. G. Kear and G. H. Wintermute of the bureau, permits the sending of voice by another transmitter on the same frequency. The same aircraft receiver catches both, but a small filter separates the voice from the reed signals and sends the voice to the pilot's headphones. Thus the pilot may listen and guide the plane simultaneously.

All commercial aircraft beacon signals used in the United States today are still different, being of the "aural" type. The pilot must steer his plane by ear. Wandering to one side, he catches the code letter "N," or to the other side the code letter "A." When he is in the middle, and on course, he hears both, which then combine to form a long dash. Obviously, while listening to code signals he cannot receive voice transmission, but with the visual range beacon system he steers by sight and may at the same time listen to radio messages.

Science News Letter, October 3, 1931

BOTANY

Wounded Maple Tree Eating Own Heart

THERE stands on the Mall, the great axial park area of Washington, D. C., a most peculiar soft maple. Years ago, a storm tore off one of its main limbs, leaving a gaping wound, open into the heart of the tree, which was already rotted and hollow. The edges of the wound formed callus and healed up as best they could, and from the upper side of the scar a number of branches sprung, as often occurs on injured trees.

But the wound callus also threw out some adventitious roots, which is not quite so usual a performance. These struck down into the hollow center of the tree, sending their fibers deep into the rotted wood, which has now decayed, at least on the surface, into a rich, moist black humus. The tree is literally eating its own heart out.

SLOW SUICIDE

That what's happening to this storm-torn maple.

Science News Letter, October 3, 1931

ETHNOLOGY

Earth-Eating Custom Still Practised by Many Tribes

EARTH-EATING, usually thought to have been a custom of antiquity, is practised by many peoples today.

Reports received at the U. S. National Museum, especially one from Dr. Berthold Laufer, Chicago anthropologist, prove conclusively that this strange habit is still widely practised in India and Persia, and comparatively so in many other countries.

Geophagy, as the custom of eating earth and clay is called, has been characterized by early scientists as an evil and a vice. However, there is in reality nothing unusual about it. Man naturally tastes and tests everything offered him by nature. Therefore, earth-eating is no more unnatural than eating salt, pepper, vegetables and animals; or chewing gum or tobacco. Earth may recommend itself to taste through color, odor, flavor, softness and plasticity. Other foods do no more.

As a rule, not every kind of earth is eaten. The most important, from a standpoint of edibility, is what is called diatomaceous earth, or kieselguhr, popularly known as "mountain meal," or "fossil meal." It is a very light, porous earth, resembling chalk or clay, and consisting of siliceous remains of very minute aquatic organisms. It varies in color from white to different shades of gray and black.

While geophagy is not a universal phenomenon, it may occur sporadically anywhere. It has nothing to do with climate, race, creed, or degree of culture. It is found in the most civilized nations, even in our own midst, as well as among primitive tribes.

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BACTERIOLOGY

Germ of Smallpox Believed Found by English Scientist

British Association Hears of Physiological Behavior Of Tiny Spheres, One-Fifth Micron in Diameter

DEMONSTRATION that the germ of smallpox is probably a minute spherical body one hundred-and-twenty-five-thousandth of an inch, or one-fifth of a micron, in diameter, near the lower limit of microscopic visibility, was announced before the meeting of the British Association for the Advancement of Science by Prof. J. C. G. Ledingham, director of the Lister Institute of London.

This climaxes the medical war against smallpox, which began with Jenner's discovery of vaccination, long before Pasteur founded bacteriology. Although smallpox has been a disease absolutely controlled for decades, incongruously enough its causative organism has been heretofore unknown. For a quarter of a century, minute spherical bodies have been found in certain virus diseases, such as smallpox and cowpox, but these have always been ignored. Their agglomerations constitute large inclusions which are striking features in the body cells and in the pox lesions of patients.

Prof. Ledingham made practically pure suspensions of minute bodies from fowlpox and vaccinal lesions, and found that they reacted specifically with serum from animals that had recovered from attacks of fowlpox or vaccinia. He also demonstrated the presence of specific agglutinins in the blood serum of a rabbit inoculated with vaccinia. Agglutinins are substances of as yet unknown nature whose presence in the blood causes bacteria and other foreign bodies to gather together in clumps.

Prof. Ledingham believes "that in a fairly large group of virus diseases of both plants and animals such minute elementary bodies are very likely to be found if carefully sought. Such demonstrations would materially assist the study of virus infections whose infective particles are below microscopic vision."

The cultivation of virus vaccinia in a medium containing no living cells was announced by Dr. G. Hardy Eagles of the Lister Institute. He used a medium composed of extract of rabbit kidney, rabbit blood serum and salt solution. This first successful attempt to cultivate a virus in a cell-free medium may eventually allow the production of vaccinia in the laboratory instead of in experimental animals. It is also important from a theoretical viewpoint.

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PSYCHOLOGY

Orang-Utan Excels Other Monkeys in Mental Test

LOTS OF MONKEYS can perform the simple trick of pushing over a cup to obtain the food which they have seen hidden under it, although that is not so easy—for a monkey—when more than one cup is used and the tempting morsel placed under only one. In fact the object-under-the-cup test is one which is used in testing ten-month-old human infants.

But a psychologist at the University of Wisconsin raised the question, can a monkey select the right cup and obtain the food if he is not allowed to reach the cups right away but is forced to wait several seconds or minutes. Dr. Harry F. Harlow tried it out on a number of different kinds of primates at a zoo.

Among the animals tested were an orang-utan, a gibbon, four macaccus rhesus, two Java monkeys, a mona monkey, two ringed-tail monkeys, a sooty mangaby, two green monkeys, three mandrils, three baboons, and a lemur. Since the experimenter and the cups and food were outside the cages, it was only necessary to keep the apparatus holding the hidden bait out of reach of the animals and to move it up to the bars at any time desired.

The dunce of the class proved to be the lemur. Although he learned to push over a cup to obtain his treat, he could not pick the right cup from two after even a momentary delay. Honors were carried off by the orang-utan. He was successful after ten-minute delays, the longest that were attempted.

A number of more difficult problems involving transposition of the containers, and discriminating between amounts of food under different cups were also solved by some of the animals.

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WHAT ARE THEY?

We have all heard of leeches, those big worms whose insatiable sanguinary appetites used to be exploited by older generations of doctors in the days when phlebotomy was a sovereign remedy for a whole host of symptoms. But how many of us have ever seen one? They still exist in the wild stage, clinging to rocks in ponds and sluggish streams; once in a while a scared small boy emerges with one or two of them clinging to his bare leg. But the day when they occupied an honored place in every 'pothecary-shop window is past. Only the tireless and sharp-eyed field naturalist deliberately seeks them now. Here, Cornelia Clark's camera has caught two of them, curled up asleep.

ARCHAEOLOGY

The Egyptian Schoolboy's Arithmetic

Mathematical Papyrus Shows that Pupils Were Taught To Multiply and Divide in Classes Held 3000 Years Ago

By EMILY DAVIS

DIVIDE 100 loaves among 10 men, including a boatman, a foreman, and a doorkeeper who receive double portions: What is the share of each?

No, this is not one of Junior's homework problems. It was not taken from the latest edition of the seventh-grade arithmetic book. It is a problem out of a book on mathematics written by an Egyptian scribe named Ahmose, who lived 1650 B.C.

As far back as that, schoolboys were struggling to divide rations among laborers, and the inquisitors who made up the problems were sugar-coating the pill by concocting little stories about the figures. Instead of dividing rations among so many men, the school boy was to think of the men as real people—a boatman, a foreman, and a doorkeeper. As far back as 1650 B.C., Egyptian schoolboys were learning how to measure the area of a triangle. Of course triangles were especially important things to understand in the land of the pyramids. Same old arithmetic, same old geometry!

How the arithmetic and geometry of the Egyptians resemble modern mathematics and how they differ in some other respects, are known today chiefly from one book. This is the book from which the problem about the loaves and the laborers was taken. The book is known today as the Rhind Mathematical Papyrus.

There are some other scraps of Egyptian books dealing with numbers, written on the papyrus which Egypt used for writing-paper. But the Rhind Papyrus is a roll of manuscript eighteen feet long, in very good condition, and dealing entirely with Egyptian mathematics. It is the great mathematical treasure from ancient Egypt.

This manuscript roll was unearthed near the ruins of the great Temple of Rameses II in Thebes almost a century ago, and bought by Henry Rhind, who gave it its name. It found its way into the British Museum. Scholars have studied the ancient roll, or photographs of it, sometimes with despair, sometimes with exultation over their success at understanding some puzzling bit of the Egyptian figuring.

Now, the papyrus is the subject of a big new two-volume publication by the American Mathematical Association, setting forth the latest achievements of science in understanding the mathematical wisdom of the Egyptians.

This one papyrus on Egyptian mathematics does reveal pretty completely what the Egyptians knew about numbers at the very height of their scientific attainments. This is the conclusion of Prof. Arnold B. Chace of Brown University, who, with the assistance of Prof. Henry P. Manning, produced the new publication.

Ahmose, the scribe, who wrote the Egyptian book, gave it an intriguing title. He could have called it "Fundamentals of Mathematics," but he didn't. He called it: "A guide for calculation, with means of ascertaining everything, of elucidating all obscurities, all mysteries, all difficulties."

Geometry for Pyramids

The Egyptian who had this impressive book in his possession is believed to have been an architect, farmer, or school teacher, or some other individual who needed a handy reference book on figures. The book contains problems showing how to use geometry to find the angle of slope of the sides of a pyramid. There are other problems showing how to calculate the amount of grain that can be stored in bins of certain size. There are tables containing the answers to the division of fractions, for ready reference.

And between the lines of the Egyptian writing, we may read the story of how Egyptian schoolboys were taught to multiply and divide and do all the other tricks with figures that they would need when they grew up and took care of Egypt's business.

Egyptian schools taught reading, writing, and arithmetic, and not very much else, except a great many ethical lessons—character education teachers call it today.

Boys started to school at the age of four, and began doing hard work at once; no kindergarten games. Girls, apparently, did not receive much education, unless tutored at home. After elementary education, a boy who was preparing for temple service, entered a higher temple school. A prospective government clerk or official continued his studies in some government office, learning to draw up reports and to keep accounts.

The scribes who served as Egyptian schoolmasters must have taught their young pupils the processes of adding,

CAT AND MOUSE PROBLEM

In the hieratic style of Egyptian writing, used in the Rhind papyrus, the cat and mouse problem can be read only by an Egyptologist. But here is the same problem translated into Egyptian hieroglyphics, or picture writing, which you can read. Symbols for the numerals are shown in the key, and, remember, read the signs from right to left. The pictures at the right of the figures are the words for houses, cats, mice, spelt, hekat, and total.

CAREFULLY MEASURING A GRAIN FIELD TO CALCULATE ACCURATELY YIELD AND TAXES

subtracting, multiplying and dividing. The Rhind Papyrus shows that the Egyptians had a thorough knowledge of these four basic operations, Prof. Chace declares.

Counted By Tens

Probably, the Egyptian child began by learning to count. The Egyptians counted by tens, as we do today. In the beginning they undoubtedly counted on their ten fingers, a device that every child still naturally returns to in time of doubt. But although the Egyptians counted by tens, they never discovered the convenient device of expressing tens, hundreds, and thousands by establishing a decimal point and measuring off places from it. Consequently, they often had to write out a great many figures in order to do a problem which would be dashed off today in great speed.

Adding has been about the same through history and all over the world. For numbers like five or eight, the Egyptian child marked down vertical bars and counted them as he marked. The first nine numerals in the hieroglyphics or picture writing of ancient Egypt were made up of little vertical bars. Three bars meant 3, seven bars 7. For 10, a horseshore-like symbol served. For 20 there had to be two horseshoes. In hieratic, or script writing, the numerals were written in shorthand symbols. The Rhind Papyrus is in this hieratic writing.

Learning to write the signs for figures and learning to add and subtract must have been primary work for the Egyptian child. It was when he came to multiplication and division that school life became hard.

The Egyptian arithmetic called for learning only two multiplication tables —the 2 table and the 10 table. No other tables, no trying to remember 7 times 9, or 8 times 7! It sounds fine. But wait until you hear what took the place of the "times" tables.

Because the Egyptian had no way of storing those combinations in his memory, so that he could give the answers at the snap of a finger, he had to do slow and tedious figuring on every example. To multiply 15 by 13, the Egyptian boy would go through the following procedure of doubling and adding:

1×15 becomes 15
2×15 becomes 30
4×15 (2×30) becomes 60
8×15 (2×60) becomes 120

He then added his 8 and 4 and 1 times 15 and got the sum of 13 times 15.

This system of doubling and adding, which seems so needlessly slow since mathematicians have worked out a simpler system, was in use in Europe even as late as the Middle Ages.

In order to divide, the Egyptian had to reverse the multiplication process, which made it a shade more complicated.

Egyptian fractions, like Egyptian multiplication, look harmlessly simple when first encountered in Ahmose's old arithmetic text. All fractions except 2/3 had the figure one for the numerator. Because of this limitation in expressing fractions, the Egyptian had to make long mental detours in order to juggle his fractional problems to a right conclusion. That he got the answers is something to wonder at.

Chief Source of Knowledge

The Rhind Papyrus is the chief source of modern knowledge about those Egyptian fractions. It contains the earliest explanation of how the problems were worked out. To express 2/29, for instance, it was necessary for an Egyptian schoolboy to add

1/24, 1/58, 1/174, 1/232

Of course, when the schoolboy grew up and put his arithmetic to use, as an accountant in the government tax-collecting offices, or as a temple scribe who recorded the offerings, he learned shorter cuts to fractional figuring. That is to say, he acquired a reference book, such as the Rhind Papyrus, which would contain long tables giving the result when fractions were broken up into parts which had one for a numerator.

The Egyptian methods in handling fractions seem indeed a triumph of mental ingenuity. But the highest mathematical attainments of the Egyptians are shown, Prof. Chace concludes, in three problems of arithmetical and geometrical progression in the papyrus.

One of these problems which represented Egyptian brain power at its best is singularly interesting, because it seems to be the origin of the familiar riddle that begins, "As I was going to St. Ives, I met a man with 7 wives, each wife had 7 cats," and so on. The Egyptian problem in arithmetical progression is as follows:

"In each of 7 houses are 7 cats, each cat kills 7 mice, each mouse would have eaten 7 ears of spelt, and each ear of spelt will produce 7 kekat of grain. How much grain is thereby saved?"

This problem in the Rhind Papyrus has a mistake in the figuring. The scribe appears to have had a fit of absent-mindedness. He copied down a 3 when he should have written a 4.

The problem of figuring out what would have happened to a household's store of grain, if the cats had not caught the rats, looks a bit far-fetched for any practical purposes. It was, we may believe, a problem simply designed to show how to work arithmetical progression, and the cats and mice merely made it interesting and gave the Egyptians a chuckle. Yet, it is no exaggeration to say that the Egyptians did try to keep track of wheat and other supplies down to the last ear. Estimating the yield of a grain field was a task which called for surveyors, bookkeepers, and perhaps auditors as well, in order that the taxes might be kept straight and the food supply for the future reckoned.

Egyptian boys who were bright at figures might hope to hold responsible posts in the service of Pharaoh or the temple. On the tomb of one scribe who served the Pharaoh Thutmose IV, is a wall painting (*Please turn to page* 220)

ETHNOLOGY

Head Hunters of Jivaros To be Featured in Movie

JIVARO Indians of Ecuador, noted the world over for their exploits at head hunting, are to have a new experience this winter. They are to be featured players in natural colored moving pictures, with sound accompaniments, taken by a scientific expedition.

Pictures of this famous, yet still somewhat mysterious tribe, are one of the projects of the Latin-American Expedition, Inc., which recently sailed from New York. The expedition, directed by Lieut. Donald C. Beatty, of the Air Corps Reserve, includes on its staff Matthew W. Stirling, chief of the Bureau of American Ethnology, who will be in charge of scientific investigation.

Mr. Stirling states that he anticipates no special difficulty in getting the Jivaro head hunters to pose for the talkies. Popular tradition has it that the Jivaros are one of the most dangerous of tribes to encounter. Their fantastic custom of taking the head of an enemy and shrinking it to the size of an orange has gained the Jivaros not only fame but some fearful respect. The heads are not merely war trophies, but are believed by the Jivaros to bring power in battle to the possessors.

Jivaros still hunt heads, secretly, more or less, Mr. Stirling said, but he added that he has traveled through Jivaro country before, and "found them very friendly." They should make attractive subjects for color photography, he believes, for they are probably the most colorful in dress of any South American tribe. Gay feathers of the toucan are a feature of Jivaro costume.

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ZOOLOGY

A Sea-Going Lizard From Galapagos

See Front Cover

WHEN Darwin, as a young naturalist just out of school, visited the Galápagos islands, he saw a number of things that helped to crystallize and precipitate in his mind the concept, already seeded there, that later revolutionized all biology and much of philosophy. Not the least provocative of speculation was a most peculiar species of sea-going lizard, the marine iguana that basked—and still does bask—in thousands on the sun-warmed rocks, slipping off into the water betimes to browse on the thick-growing seaweeds.

Reptiles, Darwin knew, are predominantly dry-land and fresh-water inhabitants; very few of them brave the sea. Big marine turtles are the most successful; there are also a few crocodilians and one small group of snakes; finally, these odd iguanas. How land-bound even these latter are in their instincts can be discovered when they are frightened. Instead of swimming out into deeper water when danger threatens, they scramble for shore. Pick one of them up by the tail and fling him out to sea, and he immediately comes back almost to your feet!

Yet the marine iguana also shows his own adaptations for a life, if not on the ocean wave, at least beneath it. Most of his kin have all sorts of frills, dewlaps and other excrescences that would be as much in a saurian swimmer's way as puffed sleeves on a bathing suit would be in the way of a human mermaid. But the marine iguana affects a stern and Spartan economy of profile; all that he retains of the heritage of his race are knobby spines on his head and the waving digitate frill down his back; and even this last is cropped close.

Science News Letter, October 3, 1931

ARCHAEOLOGY

Plentiful Remains Found In Survey of Indian Sites

POTTERY, rock-pictures, old camp-sites with teepee-rings and fire-places, "game-blinds," and deserted quarries of red chert and yellow jasper, are among the relics found in a survey of about 200 Indian sites in Eastern Wyoming.

The region searched for Indian remains included the archaeologically rich district of the so-called "Spanish Diggings." Of special interest were the quartzite quarries, which were said to recall similar quarries in England and Western Europe. Successive growths of lichen found on stone tools and refuse left by the Indian workers are expected to yield the relative age of these quarries.

In Eastern Colorado certain stone enclosures were found obviously old, but whose use is a mystery. A rock-shelter of long prehistoric occupation was partly excavated. At the "Chalk Bluffs" in Northern Colorado, as well as in Eastern Wyoming, finely-worked arrow-points of the presumably ancient "Folsom" type were found.

Science News Letter, October 3, 1931

IN SCIENC

PALEONTOLOGY

Snail Tracks of Lower Cambrian Time are Found

THERE were snails on earth half a billion years or more ago, in the time known to geologists as Lower Cambrian. Their shells have not yet been found as fossils, but they left their tracks on the silts and sands of that ancient world that have since hardened into rock.

These tracks have been known for a long time, but have always been credited to worms. But recently two geologists, Dr. and Mrs. Carroll Lane Fenton, made a critical study of snail tracks on the seashore and compared them with the ancient tracks on their stone specimens. Their conclusion is that the tracks are much more like those of modern snails than they are like any other animal trails.

To the objection that no snail shells have yet been found in Lower Cambrian fossil beds, they point out that it is not necessary to find any; for many species of snails known today are shell-less.

Science News Letter, October 3, 1931

PUBLIC HEALTH

New Epoch in Conquest Of Disease is Predicted

A NEW EPOCH, that of the invisible viruses, is opening in the fight against diseases, Dr. H. H. Dale told members of the British Association for the Advancement of Science at their centenary meeting in London.

"For the study of infection, the past century and the latter half of it especially, has been the epoch of the visible bacteria," he said. "The new century seems likely to give us an epoch of not less important discovery concerning the viruses," he predicted.

Dr. Dale opened a special discussion of these ultramicroscopic organisms which cause many serious diseases of plants, animals and man, among them rabies, infantile paralysis and foot and mouth disease. He pointed out how little is known about them.

Science News Letter, October 3, 1931

NCE FIELDS

RADIO-ASTRONOMY

Eclipses May be Visible Everywhere by Television

THE WHOLE WORLD may some day be able to see the sun in total eclipse through the medium of television, Prof. Elihu Thomson, American electrical pioneer, predicted at the Faraday Centennial in London.

"Though direct observation of a total eclipse is necessarily confined to the dark tract of the moon's shadow, television may bring us from a distance images of the sun in eclipse," Prof. Thomson said.

This prediction may be fulfilled next August, when an eclipse cuts across New England; but technical development of television broadcasting may not then be sufficiently advanced.

Even television is an outgrowth of Faraday's epochal work, Prof. Thomson said; and the Marchese Marconi, inventor of wireless, said, "In a sense wireless dates from the discovery made by Faraday that it is not necessary for two electrical circuits to be in physical contact in order that electric energy might pass across the small space between them."

Marconi expressed as his opinion, "Television is now beginning to emerge from the laboratory stage."

Marconi declared that radio, especially since the advent of short waves, has become the worldwide voice of all nations, promoting peace through interchange of knowledge.

Science News Letter, October 3, 1931

ENGINEERING

Frozen Concrete is Used In Russian Buildings

CONCRETE that freezes while setting—the process of becoming elastic and stable—will fail when thaw time comes. All engineers know that. But if the concrete is frozen before it begins to set, beating nature to it, as it were, it will be in a normal condition after thawing and will set in approved fashion.

This idea has been put into actual practise in the Union of Soviet Socialist Republics where the winters are long and cold. Reporting in the *Engineering News-Record*, A. M. Gunzburg states that he has applied this unorthodox method of concreting to buildings in the Ukraine for many years and all have turned out satisfactorily.

The procedure involves certain requirements. Because the concreting must be done rapidly, the forms are made shallow and the reinforcing bars are so arranged as to allow the concrete to flow freely and leave no empty spaces. The mixture must be cold, the water used having a temperature of 40 to 50 degrees Fahrenheit. Operations are carried out in a sheltered location and pains are taken to see that the mass freezes completely.

All this is done in the winter. When spring comes the concrete, with a little water added, thaws and behaves in a normal manner.

Science News Letter, October 3, 1931

PSYCHOLOGY

Correction not Much Help In Judgment of Length

REPETITION of attempts to judge the length of cardboard strips will lead to improvement regardless of whether the person making the guesses is given any information as to the correctness of his former estimates. And the improvement is nearly as great as when he is told each time whether his estimate is right or wrong.

This conclusion, which is at complete variance with the findings of Prof. E. L. Thorndike in a similar experiment, is announced by Prof. R. H. Waters of the University of Arkansas.

Prof. Waters attempted to duplicate exactly Prof. Thorndike's experiment except that he used, besides the group which received correct information regarding their estimates and the one which received no comment, two additional groups one of which received wrong information and one of which was given correct information part of the time and misleading comments the rest of the time.

The group who were misinformed about their judgments half the time also made some improvement, but not so much as did the group who were given no comment at all. The accuracy of the group who were given wrong comments decreased.

Science News Letter, October 3, 1931

ORNITHOLOGY

German Stork Loses Way And Ends Flight in India

A GERMAN stork that got lost on its way to Egypt, the usual wintering-ground of its species, and wound up in India, has recently been reported at Berlin. It was picked up at a little lake near Bikaner, Rajputana. On its leg was a numbered band, giving a key to its record in the archives of a German natural history society.

It had been caught, leg-banded and released in Beinrode, near Hattorf, in northern Germany. When flying-time came in the autumn it foregathered with 34 other storks, but for some reason did not depart when its companions left. A week after they had gone, it flew away also. The general direction of migration apparently had been indicated by the flight of the other birds, which flew southeastward until they reached Asia Minor and then "turned the corner" toward Egypt. The solitary belated stork seems to have followed the same course, but having nobody to show it where to change its course for Egypt, kept on flying until it passed clear over Persia and Baluchistan and landed in India.

Science News Letter, October 3, 1931

ENGINEERING

"Whitewash" Car Inspects Track for Rough Spots

WHITEWASH is dropped on portions of the track of the Great Western Railway in England. This is done for the sake of the passengers' comfort. Not that whitewashing the track will make it any easier to ride over, but it will enable the maintenance crews to spot bends, where otherwise they might not, and to take care of them or any other fault in the track. In consequence, the whitewash car is a regular inspector of the lines.

A special electrical apparatus, operated by a current from the car's lighting system, controls the whitewash pot. When the car sways farther than it should to one side or the other, the valve to the pot is opened electrically and a quart of whitewash runs out on the track. The apparatus, described in the technical journal, *The Engineer*, involves the use of electric coils which act to complete a circuit, whereby electro-magnets attached to the whitewash valve are energized.

Science News Letter, October 3, 1931

BIOLOGY-SOCIOLOGY

War—The Destroyer of Mankind

"A Classic of Science"

"The Survival of the Unfittest is the Primal Cause of The Downfall of Nations. Like the Seed is the Harvest"

THE HUMAN HARVEST. By David Starr Jordan, in Proceedings of the American Philosophical Society, Vol. XLV., April 18, 1906, Philadelphia.

SCIENCE is wisdom set in order. It is known as science by its orderly arrangement, but above and beyond all matters of arrangement the wisdom itself must take rank. Wisdom is the essence of human experience, the contact of mind with the order of nature. Of all men of his time, Benjamin Franklin was preëminently a man of wisdom. By the same token the first leader in science in America, he still takes rank with the greatest. . . .

Benjamin Franklin once said, "All war is bad; some wars worse than others." Then, once again, in more explicit terms, referring to the dark shadow of war cast over scenes of peace, the evil of the standing army, Franklin said to Baynes:

"If one power singly were to reduce its standing army it would be instantly overrun by other nations. Yet I think there is one effect of a standing army which must in time be felt so as to bring about the abolition of the system. A standing army not only diminishes the population of a country, but even the size and breed of the human species. For an army is the flower of the nation. All the most vigorous, stout, and well-made men in a kingdom are to be found in the army, and these men in general cannot marry."

What is true of standing armies is far more true of armies that fight and fall; for as Franklin said again, "Wars are not paid for in war times: the bill comes later." . . .

Once there was a great king—and the nation over which he bore rule lay on the flanks of a mountain range, spreading across fair hills and valleys green and fertile across to the Mediterranean Sea. And the men of his race, fair and strong, self-reliant and self-confident, men of courage and men of action, were men "who knew no want they could not fill for themselves." They knew none on whom they looked down, and none to whom they regarded themselves as inferior. And for all things which men could accomplish, these plowmen of the Tiber and the Apennines felt themselves fully competent and adequate. "Vir", they called themselves in their own tongue, and *virile*, virilis, men like them are called to this day. It was the weakling and the slave who was crowded to the wall; the man of courage begat descendents. In each generation and from generation to generation the human harvest was good. And the great wise king who rules them; but here my story halts—for there was no king. There could be none. For it was written, men fit to be called men, men who are *Vires*, "are too self-willed, too independent, and too self-centred to be ruled by anybody but themselves." Kings are for weaklings, not for men. Men free-born control their own destinies. "The fault is not in our stars, but in ourselves that we are underlings." For it was later said of these same days: "there was a Brutus once, who would have brooked the Eternal Devil to take his seat in Rome, as easily as a king." And so there was no king to cherish and control these men his subjects. The spirit of freedom was the only ruler they knew, and this spirit being herself metaphoric called to her aid the four great genii which create and recreate nations. Variation was ever at work, while heredity held fast all that she developed. Segregation in her mountain fastnesses held the world away, and selection chose the best and for the best purposes, casting aside the weakly, and the slave, holding the man for the man's work, and ever the man's work was at home, building the cities, subduing the forests, draining the marshes, adjusting customs and statutes, preparing for the new generations. So the men begat sons of men after their own fashion, and the men of strength and courage were ever dominant. The Spirit of Freedom is a wise master, cares wisely for all that he controls.

So in the early days, when Romans were men, when Rome was small, without glory, without riches, without colonies and without slaves, these were the days of Roman greatness.

Then the Spirit of Freedom little by little gave way to the Spirit of Domination. Conscious of power, men sought to exercise it, not on themselves but on one another. Little by little, this meant banding together, aggression, suppression, plunder, struggle, glory, and all that goes with the pomp and circumstances of war. The individuality of men was lost in the aggrandizement of the few. Independence was swallowed up in ambition, patriotism came to have a new meaning. It was transferred from the hearth and home to the trail of the army.

It does not matter to us now what were the details of the subsequent history of Rome. We have now to consider only a single factor. In science, this factor is known as "reversal of selection". "Send forth the best ye breed!" That was the word of the Roman war-call. And the spirit of Domination took these words literally, and the best were sent forth. In the conquests of Rome, *Vir*, the real man, went forth to battle and to the work of foreign invasion, *Homo*, the human being, remained in the farm and the workshop and begat the new generations. Thus "Vir gave place to Homo." The sons of real men gave place to the sons of scullions, stable-boys, slaves, camp-followers, and the riff-raff of those the great victorious army does not want.

The fall of Rome was not due to luxury, effeminacy, corruption, the wickedness of Nero and Caligula, the weakness of the train of Constantine's worth-

An Elegant Vase

topped by an ornamental brass flame, was the original

FRANKLIN STOVE

It will be described as

NEXT WEEK'S CLASSIC INVENTION

less descendants. It was fixed at Philippi, when the spirit of domination was victorious over the spirit of freedom. It was fixed still earlier, in the rise of consuls and triumvirates and the fall of the simple sturdy self-sufficient race who would brook no arbitrary ruler. When the real men fell in war, or were left in faraway colonies, the life of Rome still went on. But it was a different type of Roman which continued it, and this new type repeated in Roman history its weakling parentage.

"It is puerile," says Charles Ferguson, "to suppose that kingdoms are made by kings. The king could do nothing if the mob did not throw up its cap when the king rides by. The king is consented to by the mob, because of that in him which is mob-like. The mob loves glory and prizes, so does the king. If he loved beauty and justice, the mob would shout for him while the fine words were sounding in the air, but he could never celebrate a jubilee or establish a dynasty. When the crowd gets ready to demand justice and beauty, it becomes a democracy and has done with kings." . . .

What have the historians to say to these matters? Very few have grasped the full significance of their own words, for very few have looked on men as organisms, and on nations as dependent on the specific character of the organisms destined for their reproduction.

So far as I know, Benjamin Franklin was the first to think of man thus as an inhabitant, a species in nature among other species and dependent on nature's forces as other animals and other inhabitants must be. . . .

"Vir Gave Place to Homo"

Thus "*Vir* gave place to *Homo*," real men to mere human beings. There were always men enough such as they were. "A hencoop will be filled, whatever the (original) number of hens," said Benjamin Franklin. And thus the mob filled Rome. No wonder "the little finger of Constantine was thicker than the loins of Augustus". No wonder that "if Tiberius chastised his subjects with whips, Valentinian chastised them with scorpions."

"Government having assumed godhead took at the same time the appurtenances of it. Officials multiplied. Subjects lost their rights. Abject fear paralyzed the people and those that ruled were intoxicated with insolence and cruelty." "The worst government is that which is most worshipped as divine." "The emperor possessed in the army an overwhelming force over which citizens had no influence, which was totally deaf to reason or eloquence, which had no patriotism because it had no country, which had no humanity because it had no domestic ties." "There runs through Roman literature a brigand's and barbarian's contempt for honest industry." "Roman civilization was not a creative kind, it was military, that is destructive." What was the end of it all? The nation bred real men no more. To cultivate the Roman fields "whole tribes were borrowed." The man of the quick eye and the strong arm, gave place to the slave, the scullion, the pariah, the man with the hoe, the man whose lot does not change because in him lies no power to change it. "Slaves have wrongs, but freemen alone have rights." So at the end the Roman world yielded to the barbaric, because it was weaker in force. "The barbarians settled and peopled the country rather than conquered it." And the process is recorded in history as the fall of Rome.

"Out of every hundred thousand strong men, eighty thousand were slain. Out of every hundred thousand weaklings, ninety to ninety-five thousand were left to survive." This is Dr. Seeck's calculation, and the biological significance of such mathematics must be evident at once. Dr. Seeck speaks with scorn of the idea that Rome fell from the decay of old age, from the corruption of luxury, from neglect of military tactics or from the over-diffusion of culture."

"It is inconceivable that the mass of Romans suffered from over-culture." "In condemning the sinful luxury of wealthy Romans, we forget that the tradelords of the fifteenth and sixteenth centuries were scarcely inferior in this regard to Lucullus and Apicius, their waste and luxury not constituting the slightest check to the advance of the nations to which these men belonged. The people who lived in luxury in Rome were scattered more thinly than in any modern state of Europe. The masses lived at all times more poorly and frugally because they could do nothing else. Can we conceive that a war force of untold millions of people is rendered effeminate by the luxury of a few hundreds?

"Too long have historians looked on the rich and noble as marking the fate of the world. Half the Roman Empire was made up of rough barbarians untouched by Greek or Roman culture."

Does history ever repeat itself? It always does if it is true history. If it does not we are dealing not with history but with mere succession of incidents.

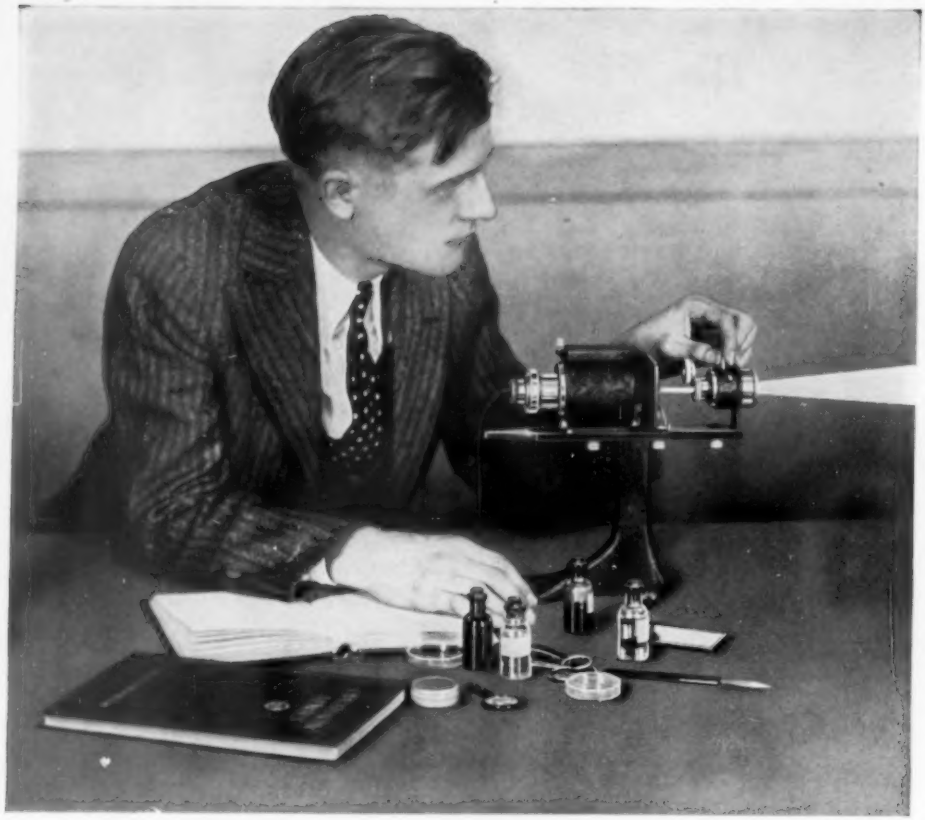
DAVID STARR JORDAN

about the time he made a world tour in behalf of peace. Dr. Jordan, who died September 19, at the age of 80, had lived to see another generation sacrificed to war.

Like causes produce like effects, just as often as man may choose to test them. Whenever men use a nation for the test, poor seed yields a poor fruition. Where the weakling and the coward survives in human history, there "the human harvest is bad," and it can never be otherwise. . . .

It is related that Guizot once asked this question of James Russell Lowell, "How long will the republic endure?" "So long as the ideas of its founders remain dominant," was the answer. But again we have this question: "How long will the ideas of its founders remain dominant?" Just so long as the blood of the founders remains dominant in the blood of its people. Not necessarily the blood of the Puritans and the Virginians alone, the original creators of the land of free states. We must not read our history so narrowly as that. It is the blood of freeborn men, be they Roman, Frank, Saxon, Norman, Dane, Goth or Samurai. It is a free stock which creates a free nation. Our republic shall endure so long as the human harvest is good, so long as the movement of history, the progress of peace and industry leaves for the future not the worst but the best of each generation. The Republic of Rome lasted so long as there were Romans, the Republic of America will last so long as its people, in blood and spirit, remain what we have learned to call Americans.

Science News Letter, October 3, 1931



A *Micro Projector for High Schools*

A NEW micro-projector has recently been devised by Bausch & Lomb especially for use in high schools. As an aid to the student's individual work with the microscope, or used alone for group instruction where other microscopes are not available, the new instrument is of great value. The use of this micro-projector simplifies notebook drawing immeasurably. It is low in price and in operating cost, as well as being simple and compact.

The projector serves three definite purposes:

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2—it projects specimens mounted in liquids;

3—it supplies a ready means for accurate drawings of microscopic fields.

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ORNITHOLOGY

Geese Are Photographed Flying at High Altitude

A FLOCK of geese accidentally included in a photograph of the sun at Dehra Dun, India, were estimated to be flying at an altitude of 29,000 feet, says Prof. T. H. Harrison of Pembroke College, Cambridge, who has gathered bird flight records.

Among other high fliers are lammergeiers, godwits, curlews and choughs, observed above 20,000 feet on Mt. Everest, and a number of birds thought to be cranes at 15,000 feet. Migratory birds are recorded as flying between 5,000 and 10,000 feet, and one observer has recorded 262 birds crossing the face of the moon from 1,500 to 15,000 feet.

Egrets were observed by night through a telescope 5,000 feet up. The main bulk of bird migration is believed to fly at less than 3,000 feet, however.

Science News Letter, October 3, 1931

Egyptian Schoolboy's Arithmetic

(Continued from Page 215)

which gives some idea of the elaborate statistical procedures sometimes followed.

The painting shows two men surveying one of the Pharaoh's grain fields, ready for harvest. Surveyors were known as "rope stretchers" in popular parlance in Egypt. These two surveyors are shown with their reels of rope, and while they measure, two scribes with tablets stand ready to write down the figures, and three boys carry the scribes' equipment.

In the scene below, the grain bin is being measured, with three scribes standing in a row, busily writing, and another scribe sitting atop of the bin, and four more of the fraternity to the right of the bin. And the chief scribe himself, owner of the tomb, is shown standing in dignity within a shelter and bossing the job.

On the whole, it appears that Egyptian mathematics was quite adequate to the needs of Egyptian business, even if it did take a corporal's squad of scribes to equal one modern adding machine. The achievements, rather than the limitations, of the Egyptian mathematicians are the impressive angle of the case.

(This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1931, by Every Week Magazine and Science Service.)

Science News Letter, October 3, 1931

ETHNOLOGY

New Laws of Indian Speech Gained From Cheyenne Study

With Researches in Oklahoma, Dr. Michelson Begins to Examine Indian Dialects, of Which There are About 150

NEW FACTS regarding the natural laws that shaped the language of an Indian tribe have been established by Dr. Truman Michelson, noted specialist in languages, of the Bureau of American Ethnology, who has just returned to Washington from researches among the Cheyennes of Oklahoma.

Aboriginal America contained many different tribes, each speaking its own distinctive language. According to one classification there were approximately 150 of these unrelated Indian languages spoken by Indian tribes of North and South America. The situation was further complicated in that some of the languages were subdivided into dialects spoken by related tribes.

Salvaging Language

Now, centuries after this great complex language system has passed out of active importance, ethnologists are studying what they can salvage of the surviving Indian languages, and learning valuable facts about the migrations and relationships of certain tribes and the manner in which human languages have evolved.

Describing his researches among the Cheyenne, Dr. Michelson explained that the Cheyenne are known to be a branch of the great Algonkian Indian family. He has been engaged in identifying the words and stems of Algonkian origin in Cheyenne speech that he could find, and then in trying to work out the laws governing the changes of the sounds from Algonkian into Cheyenne speech.

Before going to Oklahoma, Dr. Michelson pored over the only available guidebook to Cheyenne language, the Cheyenne dictionary made by a Mennonite missionary named Rudolf Petter. Petter was a practical person, and his dictionary would have been useful as an aid to communication, but it lacks features that the scientist considers essential in a study of an Indian language. Nevertheless, Dr. Michelson was able to identify several hundred Cheyenne words and stems as being definitely Algonkian, among them some parts of the body, a few numerals, a few terms of kinship. With this information, the ethnologist set out to stay among the Cheyenne, to hear them say the words that Petter had tried to write down, and to learn more about the organization of their language, first-hand.

One fact which Dr. Michelson at once observed was the importance of tone. A word in Cheyenne may not mean anything at all if it is spoken in the wrong tone—just as with us a badly misspelled word is not recognizable on a written page. To the ethnologist, that special use of tone meant some change had taken place long ago in the tribal speech. He found sufficient evidence to demonstrate that the high tones in Cheyenne are the result of dropping out a consonant, generally the letter "p." The Algonkian word would have contained the consonant.

A long vowel in Cheyenne is another clue to a law of language formation. It means that some phonetic change has taken place. In some other words of Algonkian origin, the "k" between vowels has been lost. Altogether, Dr. Michelson has established 80 examples of phonetic shifts from Algonkian to Cheyenne. So far, only a small fraction of the Cheyenne vocabulary has been demonstrated to be Algonkian in origin, he stated, but more words may be found, he believes.

Science News Letter, October 3, 1931

PHYSIOLOGY

Car Sickness is Due To Defect of Ears

IT HAS LONG been said that the way to a man's heart is through his stomach. But it is less generally known that one way to the stomach is through the ears—at least, one way to upset it. Dr. J. E. Lebensohn, of Chicago, has shown this in a recent study of car sickness.

One idea that has been prevalent about the cause of car sickness is that the primary trouble is with the muscles of the eyes, which move continually in following objects on the landscape.

The question was whether or not this movement of the eyes upset the stomach. Dr. Lebensohn brought about nystagmus, to and fro movement of the eyes, by having persons watch a revolving drum on which black and white stripes were painted. He knew that things happen in the stomach that is going to be nauseated before the owner of the stomach is aware that anything is wrong. Accordingly he arranged for registering these changes in the stomachs of his subjects by having them swallow little balloons and connecting the balloons with manometers, which serve as pressure gauges. His conclusion was that the movements of the eyes did not cause nausea.

The other prevailing idea about car sickness is that the trouble is with the balancing mechanism. To bring about disturbance of this mechanism, which is within the ear, the investigator ran cold water about the ear and into its external canal. The changes in the stomach which he had been looking for occurred in this experiment.

Therefore, he believes that car sickness is primarily due to disturbance of the balancing mechanism, although persons with certain eye troubles may be more susceptible than others.

Science News Letter, October 3, 1931

BEHAVIOR OF THE LOWER ORGANISMS

BY

Herbert S. Jennings

A description of the general body movements exhibited in the behavior of the Protozoa and Coelenterata as representative of the lowest Metazoa, this book answers the questions: What lasting changes are producible in organisms by their environment of otherwise, and what are the principles governing such modifications. (Third printing, price $4.50)

COLUMBIA University Press

ENGINEERING

Business Continues While Building is Turned Around

BUSINESS as usual. Such was the state of affairs in an eight-story telephone switchboard building in Indianapolis, despite the fact that it was moved fifty-two feet backward and turned a quarter of the way around. While the moving went on, not one of the many telephone wires was idle nor was connection lost with any of the gas, sewer, or water mains. By means of a movable bridge, an entrance to the building from the sidewalk was even made possible.

Moving the building was necessary to make room for a new structure. The building's position was changed from one corner of the lot to an adjacent one. Demolition was first considered, only to be abandoned when the loss from such a move was figured at about $1,800,000.

The unusual engineering feat was not accomplished without careful preparation. In the *Engineering News-Record*, it is described how tests were carried out with different devices before the plan of moving was decided upon. Parallel steel rollers were finally used as the medium for sliding the building along. A concrete bed six inches thick was laid down as a mat upon which to conduct operations. Timbers and T-rails covered the mat and the moving force was supplied by screw jacks and a donkey engine with cables attached.

When the building was securely braced with steel beams and girders, men went to work with the jacks, and rollers were substituted for the cast-iron pedestals upon which the building rested. The jacks, eighteen of them, succeeded in pushing the building across the block. There it had to be lifted to allow for readjustment of the rollers before the circular move began. With the donkey engine lending a hand, the structure was turned through an angle of 90 degrees so that it finally faced and bordered on streets different from those of its original position. The old pedestals of the building were then replaced.

During the moving no appreciable cracks or breaks appeared in the building and the occupants were said to be unconscious of any motion. The telephone wires were spliced during the operations, while flexible hose connections permitted the steam, water, and gas services to continue. Elevators in the building operated everywhere except in the basement.

Science News Letter, October 3, 1931

SPENCER SCIENTIFIC AND EXPERIMENTAL WORKS
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NATIONAL PARKS

Lion-Proof Huts Feature Of South African Park

IN SOUTH AFRICA'S great Kruger National Park, lions supply the thrills that are given by bears to tourists in the national parks of the United States and Canada. Lion-proof huts are the main feature of the rest camps provided for visitors.

The rest camps in the Kruger Park are all rather primitive, since most people prefer them so, and there has been considerable agitation against the erection of hotels or other elaborate accommodations. The round huts or "rondavels," made by the natives, are of mud or cement, with cement floors and thatch roofs. In the old-style huts there was a door but no window, an open space being left between the roof and the walls for ventilation. The newer huts have windows, but some people object to these for fear of lions.

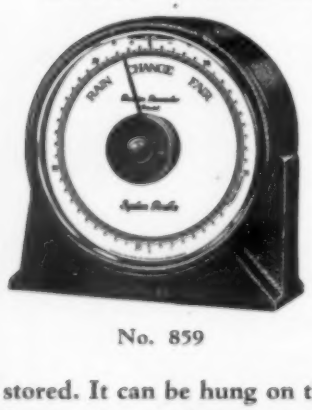
Instead of one large campfire, in the Kruger rest camps there is a long, low concrete platform with holes in the top and front at regular intervals. A fire for cooking is built under each hole by the natives who are always in attendance.

The Kruger National Park is divided into seven sections, with a ranger in charge of each. With the exception of the Pretorius Kop area, it is open only during the dry season from May 15 to November 15. The Pretorius Kop section may be visited at any time of the year, provided the traveler gets out of the low country before dark and so escapes the possibility of contracting malarial fever.

Science News Letter, October 3, 1931

More accurate than a good aneroid barometer!

THE PAULIN SYSTEM BAROMETER



No. 859

THE Paulin System Barometer, No. 859, is far more accurate than a good aneroid barometer and is equivalent to the U. S. Weather Bureau Type of mercurial barometer in reliability, since it has an actual sensitivity of and gives reliable readings to ± .02 inch of mercury pressure. With ordinary care it will last for years and will function properly through its whole life. It will withstand usage which the ordinary aneroid or mercurial barometer will not. It is small, portable and easily stored. It can be hung on the wall or stood on a desk. It does not have to be frequently tested against standard mercurial barometers. The Paulin Barometers establish an entirely new order of accuracy for barometers other than mercurial.

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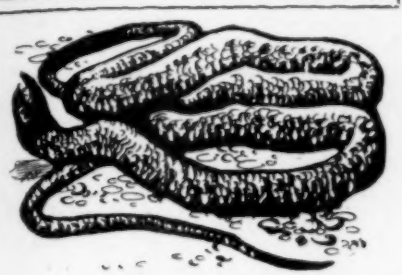
ZOOLOGY

Nature Ramblings

By FRANK THONE



Blacksnake

SHUFFLING along through fallen leaves, or idly overturning a log or stone, you may startle yourself by chasing out a blacksnake. These and other inoffensive serpents are more likely to be encountered in the autumn, when they are semi-somnolent, than in the summer when they are wide awake and better able to avoid the blundering coming of human feet.

Because a certain kind of heavy, pliable whip got the name of blacksnake, its harmless prototype has had to take the consequences. In certain rural sections, boys still solemnly believe that a blacksnake will whip you to death with his tail if he can get you into a corner, and many a poor blacksnake has had to suffer a fatal stoning on account of that legend. A blacksnake will turn his tail on you every time, of course—but only to take that tail away with the rest of his long swift body as fast as he can depart from your disagreeable neighborhood.

Of all boys, farm boys ought to let the blacksnake alone. For every one they kill, they are assuring the raiding of their fathers' corncrib by scores of field mice which would normally disappear down those black jaws, and permitting the survival of numerous black beetles and other insects that in the course of nature would eventually become blacksnake meat. Balancing that, to be sure, is the account of frogs and toads, which the blacksnake also eats, and above all the young thrushes and other songbirds that nest on or near the ground. But taken all around the blacksnake and all other non-poisonous constrictor snakes do a great deal more good than harm, and are deserving of at least our tolerance, if an Adam-old repugnance prevents us from giving them our friendship.

Science News Letter, October 3, 1931

ARCHAEOLOGY

Main Street in Old Olynthus Uncovered After 2279 Years

MAIN STREET, Olynthus, Greece, which has lain in ruins ever since 348 B. C., has been excavated by a Johns Hopkins University expedition, led by Dr. David M. Robinson, professor of archaeology. This is the news brought back by Dr. Robinson on his return to Baltimore.

An entire city block, with 27 houses, was uncovered by the expedition, and the fine street running north was given the name "Main Street."

"In the houses we found floors of beautiful pebble mosaics, in red, purple, blue, and white," said Dr. Robinson, describing the discoveries. These are the oldest mosaic floors known. Some have famous myths beautifully pictured in the pebbles. One floor shows Bellerophon and his winged horse encountering the mythical beast, the Chimera, which had a lion's head, goat's middle and the tail of a snake.

Finds Two Cemeteries

In his previous expedition of 1928, in which the ruins of Olynthus were first found and identified, Dr. Robinson was unable to locate the cemetery. This time he found two cemeteries. The custom of placing four coins in the mouth at burial was noted. This, Dr. Robinson explains, was done to provide the dead with money to pay the ferryman on the river of the underworld.

The houses that have been uncovered date from about 400 B. C., Dr. Robinson concludes. Olynthus was a large city, having a population of 65,000, judging from its ruins. It was destroyed suddenly by Philip of Macedon, the father of Alexander the Great, in 348 B. C.

Science News Letter, October 3, 1931

PSYCHOLOGY

Lack of Practise Does Not Injure Skill of Typist

THE EXPERT typist need not worry for fear she will lose her skill during periods when she has no practise. Dr. J. E. Coover, of Stanford University, has found that typing skill persists even over a period of fifteen years in which no consistent drill was taken. The actual loss in skill during this time was only four per cent.

Dr. Coover has made a careful analysis of the movements of expert typists. One of the interesting facts disclosed by his study was that when the typist is equally skilled with the use of the left-hand and right-hand levers for throwing back the carriage at the end of a line, the left-hand lever required 21 per cent. more time in typing English than the right-hand type.

Science News Letter, October 3, 1931

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• First Glances at New Books

Agricultural Economics

THE INTRODUCTION OF FARM MACHINERY IN ITS RELATION TO THE PRODUCTIVITY OF LABOR IN THE AGRICULTURE OF THE UNITED STATES DURING THE NINETEENTH CENTURY. I: THE PLOW. II: WHEAT PRODUCTS—Leo Rogin—*University of California Press,* 260 p., $3.50. At a time when the whole civilized world is confronted by problems created by huge surpluses in agricultural products, which in turn were created in part by the efficiency of farm machinery, these two treatises of Dr. Rogin's are of especial interest. As in urban industry, the machine-made revolution in agriculture is practically altogether an affair of the nineteenth century, and by telling the story of two of its very important group machines and their evolution through that period so thoroughly and completely, Dr. Rogin has made a contribution of solid and permanent value to the literature.

Science News Letter, October 3, 1931

Medical Economics

THE YOUNG DOCTOR THINKS OUT LOUD—Julian P. P. Price—*Appleton,* 187 p., $1.50. The author, himself a young physician, tells what he and his contemporaries think of their profession, their medical training and why they selected medicine as a career. Young medical and premedical students will find this small book full of useful information, while established physicians, professors of medicine and hospital superintendents will find some stimulating, if respectful criticism.

Science News Letter, October 3, 1931

Horticulture

AMERICAN ALPINES IN THE GARDEN—Anderson McCully—*Macmillan,* 251 p., $2.50. It has been a standing complaint among the large number of persons interested in rock-gardening that too large a proportion of available plants are exotics. We have many fine natives worthy of a stony place in the sun; and here finally is a manual that tells what they are, where they come from and what to do with them.

Science News Letter, October 3, 1931

Physics

TERRESTRIAL ELECTRICITY—Fernando Sanford—*Stanford University Press,* 208 p., $3. The author boldly presents revolutionary theories of the electrical charge of the sun and of the earth, earth currents, magnetic storms and other terrestrial phenomena; though he does not support them with mathematical argument. Anticipating a hostile reception, he says in his preface that he believes "that the conclusions which he has reached . . . . are important enough to risk having his name placed upon the list of madmen who have tried to find intelligible interpretation of the complex phenomena of the physical universe."

Science News Letter, October 3, 1931

Astronomy

LES OBSERVATOIRES ASTRONOMIQUES ET LES ASTRONOMES—P. Stroobant, J. Delvosal, E. Delport, F. Moreau and H. L. Vanderlinden—*Casterman, Tournai-Paris,* 315 p., 10 francs (Swiss). This group of Belgian astronomers have placed in their debt not only all colleagues of their own discipline but also all persons who have occasion to look up, for any purpose, information about any observatory or astronomer. The observatories are listed in alphabetic order of the cities where they are located; exact latitude and longitude is given, a brief summary of the foundation of each and a list of the principal instruments. The information also includes the name and specialty of each staff member, and an outline of the program of the observatory.

Science News Letter, October 3, 1931

Forestry

THE EVERGREEN FORESTS OF LIBERIA—G. P. Cooper and S. J. Record—*School of Forestry, Yale University,* 153 p., 15 pl., $1. A report on investigations made in Liberia by the Yale University School of Forestry in cooperation with the Firestone Plantations Company; it will be of interest alike to botanists and foresters.

Science News Letter, October 3, 1931

Zoology

STRANGE ANIMALS I HAVE KNOWN—Raymond L. Ditmars—*Brewer, Warren and Putnam,* 375 p., $3.50. The author's principal business is with reptiles, and he can tell tales about handling them in the zoo and traveling with them by rail and steamer and less modern means of transportation. Some of the tales are amusing, some quite hair-raising. Besides these, he has had to do with out-of-the-way creatures wearing fur and feathers.

Science News Letter, October 3, 1931

Botany

FIELD WORK FOR THE LOCAL BOTANIST—A. S. Hitchcock—*Author,* 58 p., $1. Dr. Hitchcock has travelled far and brought back many strange and interesting plants from foreign lands; but those who know him best agree that his botanical discourses have the greatest charm when he talks about things that anybody can find in his own back yard or in the course of an afternoon's ramble afield. In this small book he condenses much of his lore, presenting it in such form that a decently trained amateur can take hold of it and lay out a program of consistent observation or minor research for himself. It is not a "key"; indeed much of the work here suggested can be done without even knowing the names of the plants, for the book is concerned more with their natural history than with their taxonomy. Especially useful are the chapters showing how many interesting things can be learned from plants in winter, when botany is supposed (by the unobserving) to be at a standstill.

Science News Letter, October 3, 1931

Travel

TRAILS TO INMOST ASIA—G. N. Roerich—*Yale University Press,* 504 p., $7.50. Kashmir, Khotan, Urumchi, the land of the Hor-Pas, and a score of other regions at the inaccessible center of all the world where nobody ever goes—all these the author has visited and photographed the people that are in them; and he tells about it, most interestingly, in his book.

Science News Letter, October 3, 1931

Cytology

A TEXT-BOOK OF EXPERIMENTAL CYTOLOGY — James Gray—*Macmillan,* 516 p., $7.50. Most textbooks in the subject of cytology content themselves with presentation of what might be called its "statics"; this book, on the contrary, is concerned primarily with the cell as a living, developing, often moving entity. In its special field it will therefore be especially welcomed.

Science News Letter, October 3, 1931

Evolution

EVOLUTION—J. Arthur Thomson—*American Library Assn.,* 48 p., cloth 50c, paper 35c. A better author than J. Arthur Thomson for this particular number in the Reading With a Purpose series could hardly be found.

Science News Letter, October 3, 1931